Non-technical summary

The social cost of leaded gasoline: Evidence from regulatory exemptions[1]

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Despite being banned for on-road use, leaded gasoline is still widely used in the United States. Exemptions allow for leaded fuel to be used for both aviation and automotive racing. These continued exemptions are a major threat to public health as they expose broad segments of the population to unsafe levels of lead. Over 500,000 gallons of leaded aviation fuel are combusted each day in the United States and an unknown amount of racing fuel is combusted across the country.

In this study, we estimate the cost of the negative health effects of leaded gasoline by exploiting a natural experiment where two major racing organizations, NASCAR and ARCA, switched from leaded to unleaded fuel in 2007. A single three-hour automotive race using leaded fuel can emit more lead than the total annual emissions of 70% of US lead-emitting industrial facilities tracked, and as much lead as the average airport in an entire year.

We provide robust evidence that leaded gasoline use increases airborne lead pollution, increases rates of elevated blood lead in children, and increases elderly mortality. Our findings indicate that even at present day airborne lead concentrations, additional exposure can increase blood lead levels and elderly mortality. We estimate that the reduction in annual lead emissions from deleading NASCAR and ARCA races yielded social benefits of $2.2 billion per year from avoided elderly mortality alone. Our estimates suggest that the cost of a gram of lead added to gasoline is over $1,100.

Our results are the first causal estimates linking adult mortality to leaded gasoline, highlight the historic value of banning on-road leaded gasoline, provide policy-relevant cost estimates of lead emissions at the lowest ambient levels to date, and demonstrate the costs of continued regulatory exemptions.

Even though our study is not about aviation fuel. It has important policy implications for the continued regulatory exemption that allows for the use of leaded aviation fuel. Even if the external effects of aviation gasoline are only 1% ($10 per gram) of our racing fuel estimates, then the socially efficient price of leaded aviation fuel would be at least three times higher than current market prices.

[1]Working paper citation and link: Hollingsworth, Alex, and Ivan Rudik. 2019. "The Social Cost of Leaded Gasoline: Evidence from Regulatory Exemptions." SocArXiv. September 23. doi:10.31235/osf.io/rdy6g.

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Figure 1: Exposure to emissions from leaded fuel causes elevated blood lead levels and increased mortality.